

Amendment and Response Under 37 C.F.R. 1.116

Applicant: Ray Mentzer

Serial No.: 10/008,968

Filed: December 6, 2001

Docket No.: 10010675-1

Title: APPARATUS AND METHOD FOR OBTAINING AVERAGE SCENE INTENSITY INFORMATION
FROM A PHOTO DETECTOR ARRAY

IN THE CLAIMS

Please add claim 21.

Please amend claims 1 and 13 as follows:

1.(Currently Amended) An optical sensor array comprising:

an array of pixel circuits, each pixel circuit including a photo detector, a voltage supply line, and an output node for outputting image signals from the pixel circuit, wherein the voltage supply lines of ~~the each~~ pixel circuits ~~are~~ connected directly to a common node of the sensor array that is separate from the output nodes of the pixel circuits;

a voltage supply input configured to be coupled to a voltage supply and to the common node for supplying a voltage to each pixel circuit; and

a sensing circuit coupled to the common node for sensing signals at the common node and outputting at least one signal representative of an average intensity of light directed onto the array of pixel circuits.

2.(Original) The optical sensor array of claim 1, and further comprising:

a switching device coupled between the voltage supply input and the common node for selectively connecting and disconnecting the voltage supply input and the common node.

3.(Original) The optical sensor array of claim 2, wherein the switching device is a transistor.

4.(Original) The optical sensor array of claim 2, wherein the sensing circuit comprises:

a first, a second, and a third FET transistor, the second transistor coupled between the first and the third transistors;

a first and a second current source, the first transistor coupled between the voltage supply input and the first current source, the third transistor coupled between the voltage supply input and the second current source; and

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an output node coupled between the third transistor and the second current source, the at least one signal output by the sensing circuit being output at the output node.

5.(Original) The optical sensor array of claim 4, wherein the first, second, and third FET transistors are NMOS FET transistors.

6.(Original) The optical sensor array of claim 1, wherein the at least one signal output by the sensing circuit includes a reference signal and an integration signal, the optical sensor array further comprising:

a column amplifier coupled to the sensing circuit for receiving the reference signal and the integration signal, the column amplifier configured to output a difference signal representing a difference between the reference signal and the integration signal.

7.(Original) The optical sensor array of claim 6, and further comprising:

a gain amplifier coupled to the column amplifier for receiving the difference signal from the column amplifier and outputting an amplified difference signal.

8.(Original) The optical sensor array of claim 7, and further comprising:

an analog-to-digital converter coupled to the gain amplifier for receiving and digitizing the amplified difference signal, and outputting at least one digital value.

9.(Original) The optical sensor array of claim 8, and further comprising:

a digital controller coupled to the analog-to-digital converter for outputting camera exposure information based on the at least one digital value.

10.(Original) The optical sensor array of claim 1, and further comprising:

a digital controller configured to output control signals for controlling operation of the pixel circuits and the sensing circuit.

11.(Original) The optical sensor array of claim 10, wherein the digital controller comprises:

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a register set for providing selectable modes of operation of the optical sensor array, the modes of operation including at least one normal mode of operation and a global mode of operation; and

a timing controller coupled to the register set for generating the control signals based on a selected mode of operation.

12.(Original) The optical sensor array of claim 11, wherein the control signals generated by the timing controller during the global mode of operation include signals for causing a global reset of the pixel circuits and for causing the pixel circuits to be isolated from the voltage input.

13.(Currently Amended) A method of obtaining average scene intensity information from a pixel array, the pixel array including a plurality of pixel circuits, each pixel circuit including a voltage supply line, the voltage supply lines of the pixel circuits coupled directly to a common power supply node of the pixel array, the common power supply node of the pixel array that is configured to be coupled to a voltage supply, each pixel circuit including an output node for outputting image signals from the pixel circuit, the method comprising:

isolating the pixel circuits from the voltage supply;

sensing signals at the common power supply node generated by the plurality of pixel circuits; and

generating at least one signal based on the sensed signals, the at least one signal representative of an average intensity of light directed onto the pixel array.

14.(Original) The method of claim 13, wherein the at least one signal includes a reference signal and an integration signal, the method further comprising:

generating a difference signal representing a difference between the reference signal and the integration signal.

15.(Original) The method of claim 14, and further comprising:

generating at least one digital value based on the difference signal.

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16.(Original) The method of claim 15, and further comprising:
generating camera exposure information based on the at least one digital value.

17.(Original) A circuit for obtaining average scene intensity information from a pixel array having a plurality of pixel circuits, each pixel circuit coupled to a common power supply node that is configured to be coupled to a power supply, the circuit comprising:

an isolating device coupled between the common power supply node and the power supply, the isolating device configured to connect the power supply to the common power supply node during a normal mode of operation of the pixel array, the isolating device configured to isolate the common power supply node from the power supply during a global mode of operation of the pixel array; and

a sensing circuit coupled to the common power supply node for generating at least one signal indicative of an average intensity of light directed onto the pixel array during the global mode of operation.

18.(Original) The circuit of claim 17, wherein the at least one signal generated by the sensing circuit includes a reference voltage and an integration voltage, and wherein a difference between the reference voltage and the integration voltage is indicative of an average intensity of light directed onto the pixel array during the global mode of operation.

19.(Original) The circuit of claim 17, wherein the isolating device and the sensing circuit are configured to be controlled by control signals generated by digital control logic associated with the pixel array.

20.(Original) The circuit of claim 17, wherein the sensing circuit comprises:

a first, a second, and a third transistor;

a first and a second current source, the first and the second transistors coupled in parallel to the first current source, the second and third transistors coupled together, the third transistor coupled to the second current source; and

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an output node coupled between the third transistor and the second current source, the at least one signal generated by the sensing circuit being output at the output node.

21.(New) An optical sensor array comprising:

an array of pixel circuits, each pixel circuit including a photo detector and a voltage supply line, the voltage supply line of each pixel circuit connected to a common node;

a voltage supply input configured to be coupled to a voltage supply and to the common node for supplying a voltage to each pixel circuit;

a sensing circuit coupled to the common node for sensing signals at the common node and outputting at least one signal representative of an average intensity of light directed onto the array of pixel circuits; and

a digital controller configured to output control signals for controlling operation of the pixel circuits and the sensing circuit, wherein the digital controller comprises:

a register set for providing selectable modes of operation of the optical sensor array, the modes of operation including at least one normal mode of operation and a global mode of operation; and

a timing controller coupled to the register set for generating the control signals based on a selected mode of operation, wherein the control signals generated by the timing controller during the global mode of operation include signals for causing a global reset of the pixel circuits and for causing the pixel circuits to be isolated from the voltage input.